NORTH CAROLINA DIVISION OF AIR QUALITY

Air Permit Review

Permit Issue Date:

Region: Winston-Salem Regional Office
County: Rockingham
NC Facility ID: 7900174
Inspector's Name: Robert Barker
Date of Last Inspection: 07/26/2015
Compliance Code: Compliance

Facility Data

Applicant (Facility's Name): Rockingham County Landfill

Facility Address:
Rockingham County Landfill
281 Shuff Road
Madison, NC 27025

SIC: 4953 / Refuse Systems
NAICS: 562212 / Solid Waste Landfill

Facility Classification: Before: Small **After:** Title V
Fee Classification: Before: Small **After:** Title V

Permit Applicability (this application only)

SIP: 02D .0516, 02D .0521, 02D .0524, 02D .1111, 02D .1806
NSPS: Subpart WWW, Subpart JJJJ
NESHAP: N/A
PSD: NA
PSD Avoidance: NA
NC Toxics: 02D .1100, 02Q .0711
112(r): N/A
Other: MACT Subpart ZZZZ, State SB3 BACT

Contact Data

Facility Contact	Authorized Contact	Technical Contact
Kathryn Pringle Jolly Env. Compliance Solid Waste Program Manager (336) 347-2025 P.O. Box 132 Wentworth, NC 27375	Kathryn Pringle Jolly Env. Compliance Solid Waste Program Manager (336) 347-2025 P.O. Box 132 Wentworth, NC 27375	Kathryn Pringle Jolly Env. Compliance Solid Waste Program Manager (336) 347-2025 P.O. Box 132 Wentworth, NC 27375

Application Data

Application Number: 7900174.14A
Date Received: 11/25/2014
Application Type: Modification
Application Schedule: TV-1st Time

Existing Permit Data
Existing Permit Number: 10200/R01
Existing Permit Issue Date: 02/13/2013
Existing Permit Expiration Date: 09/30/2016

Total Actual emissions in TONS/YEAR:

CY	SO2	NOX	VOC	CO	PM10	Total HAP	Largest HAP

No emissions inventory on record.

Review Engineer: Lori Ann Phillips

Review Engineer's Signature: **Date:**

Comments / Recommendations:
Issue: 10200/T02
Permit Issue Date:
Permit Expiration Date:

1. Purpose of Application:

Rockingham County Landfill (RCL) has submitted a permit application for a 1st Time Title V with a modification for its facility located in Madison, Rockingham County, NC. The facility is located at 281 Shuff Road in Madison, NC and is currently permitted as a "Small" facility (permit 10200R01). RCL reported a design capacity of greater than 2.5 million megagrams (Mg) of waste and greater than 2.5 million cubic meters volume in both the permit application and in a letter from Joyce Engineering, Inc. dated September 16, 2013; therefore, a Title V permit is now required for the facility since NSPS Subpart WWW is triggered. This application shall be processed as a First Time Title V/Permit

Renewal. The facility also wishes to modify their State SB3 BACT permit limits for NOx and CO.

2. Facility/Equipment Description:

A. Facility Overview

RCL is a MSW landfill consisting of pre-Subtitle D Areas 1-5 and Subtitle D Phases 1-4. As of September 16, 2013, the design capacity of the site was 2,859,595 Mg. Tier 1 testing resulted in an NMOC emission rate of 277 Mg/year. On March 14, 2014, a revised NMOC emission rate of 16.6 Mg/year was reported using Tier 2 methods. The existing permitted emission sources and control devices at the facility include the following:

- ES-1: MSW Landfill (NSPS Subpart WWW)
- CD-1: Landfill gas flare - 400 standard cubic feet per minute (scfm)
- ES-2: Landfill gas engine - 800 kilowatts (kW), 1,108 brake horsepower (bhp) (NSPS Subpart JJJJ and NESHAPS Subpart ZZZZ)

The landfill does not trigger the NSPS Subpart WWW requirements to install and operate an active landfill gas (LFG) collection system since the NMOC emission rate is less than 50 Mg/year. However, the facility does have an existing voluntary collection and control system already installed. Collected LFG is either routed to the utility flare (CD-1) or the LFG-fired engine (ES-2). The flare serves as back-up when the engine is down or if there is excess LFG.

RCL also has a number of existing insignificant activities including the following:

- IES-1: Storage tank containing No. 2 fuel oil (3,000 gallons capacity)
- IES-2: Storage tank containing used oil (500 gallons capacity)
- IES-3: Storage tank containing used oil (280 gallons capacity)
- IES-4: No. 2 fuel oil-fired emergency engine-generator set (80 kW, 119 bhp)(NESHAPS Subpart ZZZZ)
- IES-5: No. 2 fuel oil-fired emergency engine-generator set (16 kW, 26 bhp)(NESHAPS Subpart ZZZZ and NSPS Subpart IIII)
- IES-6: Propane-fired emergency engine-generator set (13 kW, 30 bhp)(NESHAPS Subpart ZZZZ)

B. Equipment Description

a. Utility Flare (CD-1) – 400 scfm maximum permitted flow rate. The existing utility flare was manufactured by “The Flare Guy” in 2011 and put into operation in November of 2011. Landfill gas that is produced from the decomposing waste is routed to the open utility flare to provide destruction of methane and organics. Any emissions associated with the flare are a result of combustion by-products.

CD-1 operates as a backup device for periods when the LFG-fired engine is not in operation or when excess LFG exists.

b. Landfill gas-fired engine-generator set (ES-2) - 800 kilowatts, 1,108 brake horse power. The landfill began operating this engine on January 15, 2013 as a means of controlling emissions from the landfill, as well as for generating electricity. ES-2 is a lean burn 2GCenergy engine, model 2G avus – TCG 2016. This unit has a maximum fuel usage design capacity of 219 scfm.

3. Application Chronology:

November 25, 2014	Received permit modification application 7900174.14A at RCO. The application package included necessary forms, authorized signature, and zoning consistency determination. A fee was not collected as this facility triggered into a Title V application due to the NSPS Subpart WWW requirements.
November 25, 2014	An acknowledgement letter was sent to Michael McElhare, Solid Waste Program Manager at Rockingham County Landfill.
October 23, 2015	Emailed Stephen Cowie, consultant with Joyce Engineering, Inc. to inquire about the toxics emissions estimates submitted with the application.
November 4, 2015	Called Stephen Cowie since no email response had been received and discovered that he is no longer with the company. I spoke with Alex Everhart (336-323-0092) regarding the potential need for toxics modeling for benzene, hydrogen sulfide, and vinyl chloride. Alex is going to review the files and get back to DAQ regarding toxics modeling.
November 10, 2015	Received an email from Alex Everhart indicating that the air toxics emissions estimates were based on the year 2020 landfill gas flow calculated using LANDGEM.
November 13, 2015	Emailed Alex Everhart to request clarification regarding current actual expected toxic emissions for the facility, as well as a copy of the LANDGEM model run.
November 23, 2015	Received email from Alex Everhart that included a 2015 HAPs/TAPs summary for Rockingham County Landfill, as well as the most current LANDGEM 3.02 model run.
December 8, 2015	Emailed a copy of the draft permit to Alex Everhart.

December 15, 2015	Requested updated toxics modeling via official additional information request.
January 14, 2016	Received air toxics modeling, via email, using SCREEN3 from Mousa Maimoun, Project Consultant with Joyce Engineering.
January 15, 2016	Emailed Mousa Maimoun to request that the modeling be rerun using AERSCREEN, as SCREEN3 was replaced in October 2012.
February 29, 2016	Received updated air toxics modeling using AERSCREEN from Mousa Maimoun via email.
April 27, 2016	The modeling group received final revised air toxics modeling at RCO from Mousa Maimoun.
May 18, 2016	Received air toxics modeling memo from Daryl Grassick, Meteorologist II. The memo indicated that the submitted modeling demonstrated compliance.
May 24, 2016	Emailed Mousa Maimoun and Kathryn Jolly, Environmental Compliance Solid Waste Program Manager, to discuss that a revision of the facility's BACT emission limits should be submitted to DAQ. (permit placed on hold)
July 6, 2016	Received email from Mousa Maimoun that included the revised BACT limits request for the engine-generator at Rockingham County Landfill. I emailed him back and requested a hard copy signed by the authorized official be submitted. The emailed copy was not signed by the authorized official for the facility.
July 7, 2016	Received call from Robert Barker, WSRO, indicating that there were potential toxics exceedances noted on the submitted 2015 emissions inventory. Toxics values for benzene, hydrogen sulfide, and vinyl chloride exceed the modeled rates that were set to be placed in the updated permit. I emailed Mousa Maimoun to request clarification.
July 18, 2016	Email response from Mousa Maimoun describing how the emissions were calculated for the inventory. The facility used a 25% collection efficiency for their landfill gas collection system. AP-42 standard is 75% collection

	efficiency; however, Rockingham County can show that theirs is lower for now. According to Mousa, the efficiency is closer to 35% and the values for the inventory will be corrected and resubmitted. This should take care of the discrepancy.
July 18, 2016	Received signed revised BACT request at RCO. (permit off hold)
July 28, 2016	Received phone call from Robert Barker, WSRO, who recently inspected the facility and informed me that the nameplate for the engine indicated that the unit was 826 kilowatts and 1,108 horsepower. This is only slightly different than what is currently listed in the permit. The source description will be updated. Additionally, Mr. Barker observed a number of insignificant activities that shall be added to the permit.
August 24, 2016	Sent the draft permit and review documents to the regional office and Mousa Maimoun for review.
September 2, 2016	Received comments on the draft documents from Mousa Maimoun.
September 2, 2016	Emailed Mousa Maimoun to confirm the insignificant activities observed during the July inspection.
September 7, 2016	Received email from Mousa Maimoun confirming the additional insignificant activities to be added to the permit.

4. **Regulatory Review:** This facility is subject to the following regulations: 02D .0516, 2D .0521, 02D .0524 (Subpart WWW), 02D .0524 (Subpart JJJJ), 02D .1111 (Subpart ZZZZ), 02D .1806, and 02Q .0711.

02D .0516 – Sulfur Dioxide Emissions from Combustion Sources – Sulfur dioxide emissions from the flare (CD-1) and LFG engine (ES-2) shall not exceed 2.3 pounds per million Btu. Continued compliance is expected.

02D .0521 – Visible Emissions Control Requirement – Visible emissions from the affected sources shall not be more than 20 percent opacity when averaged over a 6-minute period. Compliance is expected and will be verified during facility inspections.

02D .0524 – New Source Performance Standards Subpart WWW – This landfill is subject to 40 CFR Part 60, Subpart WWW because the facility was built after May 30, 1991. Due to the capacity of the landfill being greater than 2.5 million Mg and the

volume being greater than 2.5 million cubic meters, the facility is subject to Title V permitting. The facility, however, is not required to install a GCCS per §60.752(b)(1) since their NMOC emissions are below the 50 Mg threshold (16.6 Mg in March 2014). Because the GCCS was installed voluntarily, the landfill is not subject to §63.753, *Operational Standards for Gas Collection System.*

The facility shall determine the NMOC emission rate according to the procedures set forth in the permit stipulation and take the appropriate actions as necessary. The facility shall keep at least 5 years of design capacity reports, the current amount of solid waste in-place, and the year-by-year waste acceptance rate. The facility shall submit an annual NMOC emission rate report by January 30 of each calendar year unless the estimated NMOC emission rate is less than 50 Mg per year in each of the next 5 consecutive years. In that case, the facility may elect to submit an estimate of the NMOC emission rate for the next 5-year period in lieu of the annual report.

02D .0524 – New Source Performance Standards Subpart JJJJ – The facility shall continue to comply with this regulation for the LFG-fired engine-generator (ES-2) and follow all testing, recordkeeping, reporting, and notification requirements. The exhaust emissions standards for ES-2 continue to be the following:

CO: 5.0 g/Hp-hr or 610 ppmvd at 15% O_2
NOx: 2.0 g/Hp-hr or 150 ppmvd at 15% O_2
VOCs: 1.0 g/Hp-hr or 80 ppmvd at 15% O_2

02D. 1111 – National Emissions Standards for Hazardous Air Pollutants Subpart ZZZZ – The facility maintains compliance with this regulation by staying in compliance with NSPS Subpart JJJJ. No recordkeeping or reporting is required.

02D .1806 – Control and Prohibition of Odorous Emissions – The facility shall continue to comply with this permit stipulation. Compliance is expected and will be verified during facility inspections.

02Q .0711 – Toxic Air Pollutant Emission Rates Requiring a Permit – The facility has previously demonstrated that facility-wide actual emissions do not exceed the TPERs for the list of pollutants shown in the table in Section 8 below. Continued compliance is expected.

02D .1100 – Toxic Air Pollutant Emissions Limitation Requirement – This permit stipulation shall be added to the permit as a result of the toxic modeling submitted for benzene, vinyl chloride, and hydrogen sulfide. Further discussion is provided below in Section 8. Compliance is expected and will be verified by reviewing annual emissions inventories.

5. Changes to Permit:

This is a First Time Title V permit and a completely new Title V permit will be generated. RCL will be changing from a Small to a Title V permitted facility.

- Updated the source description for ES-2 to reflect the information found on the nameplate of the engine, or 826 kilowatts and 1,108 horsepower.
- Added NSPS Subpart WWW to the permit.
- Added the 02D .1100 permit stipulation for toxics emissions limits for benzene, hydrogen sulfide, and vinyl chloride which were established through dispersion modeling.
- Updated the SB3 BACT permit stipulation to show that the emission limits for CO and NOx shall now be equal to the NSPS Subpart JJJJ emissions limits for the same pollutants.
- Updated the Insignificant Activities with sources found during the July 2016 facility compliance inspection.

6. NSPS, NESHAPS, MACT, PSD, and Attainment Status:

This facility is a PSD minor source located in Rockingham County, which is in attainment for all criteria pollutants.

The LFG engine (ES-2) is subject to MACT Subpart ZZZZ and NSPS Subpart JJJJ.

The MSW Landfill (ES-1) is now subject to NSPS Subpart WWW. As of September 16, 2013, the facility's permitted design capacity exceeded 2.5 million Mg and 2.6 million cubic meters in volume. The facility has not triggered the requirement to install and operate a LFG collection and control system since the calculated NMOC emissions rate (16.6 Mg/year) is less than 50 Mg/year; however, RCL has voluntarily installed such a system and operates it accordingly, routing collected LFG to either the LFG engine (ES-2) or utility flare (CD-1).

NESHAPS Subpart AAAA does not apply to this facility since its estimated uncontrolled emission rate of NMOCs does not exceed 50 Mg/year.

7. BACT Analysis

An SB3 analysis was completed for RCL on February 5, 2013 by Booker Pullen. The original BACT limits established for the R01 permit included the following:

- CO emissions shall not exceed 2.75 g/hp-hr;
- NOx emissions shall not exceed 1.1 g/hp-hr;
- PM10/PM2.5 emissions shall be controlled from each engine using good combustion practices and the burning of landfill gas in the engine;
- SO2 shall be controlled from each engine using good combustion practices and the burning of landfill gas in the engine;
- VOC shall be controlled from each engine using good combustion practices and the burning of landfill gas in the engine;
- Hg shall be controlled from each engine using good combustion practices and the burning of landfill gas in the engine; and
- Pb shall be controlled from each engine using good combustion practices and the burning of landfill gas in the engine.

* Note: PM10/PM2.5 emissions have been changed in the most recent SB3 submittals to be good combustion practices. This change has been implemented in the new Title V permit for RCL.

In response to stack testing that indicated compliance with NSPS Subpart JJJJ and BACT emissions limits, but showed that the facility may encounter compliance issues in the near future, the facility submitted a BACT modification request on July 6, 2016 to raise the emissions limits for CO and NOx to 3.5 g/hp-hr and 2.0 g/hp-hr, respectively. These requested limits would still comply with the NSPS Subpart JJJJ emissions limits.

In the time since Rockingham County Landfill requested modified BACT limits for its engine, DAQ has decided that the State BACT emission limits for CO and NOx for landfill gas-fired engines shall be equal to the NSPS Subpart JJJJ limits for these pollutants. Please see the attached BACT analysis, applicable to all spark ignition landfill-gas fired engines, for addition information and discussion of the methodology for this decision. At the time of permit issuance, the current NSPS emission limits for CO and NOx are 5.0 g/hp-hr and 2.0 g/hp-hr, respectively. BACT for PM, VOCs, SO2, lead, and mercury shall remain as using "good combustion practices" and the firing of landfill gas in the engine.

8. Facility Wide Air Toxics:

The facility submitted estimated facility-wide air toxics emissions with their air permit application. The application indicated that benzene, hydrogen sulfide, and vinyl chloride exceeded the NC TPERs and that modeling may be required. After speaking with the consultant regarding these three toxic pollutants, it was determined that the emissions estimates were based on the year 2020 landfill gas flow calculated using LANDGEM software. Upon request, the consultant provided the 2015 air emissions inventory for landfill fugitive emissions. Benzene, hydrogen sulfide, and vinyl chloride were noted to exceed the NC TPERs. The toxics emissions from this permit application were compared to those that were submitted in 2011. In 2011, the flare and engine were included in the calculations; however, the landfill fugitive toxic emissions were not, as the landfill was exempt from permitting at the time. Now that the landfill is subject to NSPS Subpart WWW, its toxic emissions must also be considered. Based on the toxic data submitted with this permit application, a request for a toxics modeling demonstration for benzene, hydrogen sulfide, and vinyl chloride was made.

RCL submitted a toxics modeling demonstration as requested. The facility included the landfill (area source), the flare (point source), and the LFG-fired genset in the analysis. AERSCREEN (version 15181), using EPA default meteorological settings, was used to evaluate impacts in gently rolling terrain. Receptors were placed at intervals of 25 meters and extended out to 5,000 meters. Further detail on the modeling parameters can be found in the memo to Booker Pullen dated May 18, 2016.

The modeling demonstrated compliance with the AALs for benzene, vinyl chloride, and hydrogen sulfide. The following table shows the maximum impacts for toxics modeled at RCL.

Pollutant	Avg. Period	Max. Conc. (ug/m^3)	AAL (ug/m^3)	% of AAL
Benzene	Annual	3.48E-02	0.12	28.99%
Hydrogen sulfide	24-hr	3.95E-01	120	< 1%
Vinyl chloride	Annual	1.39E-02	0.38	3.65%

The following table lists the toxic pollutants emitted by this facility and their expected actual emission rates after controls.

TAP	Actual Emissions	TPER
Hydrogen chloride	0.1652 lb/hr	0.180 lb/hr
1,1-Dichloroethene	0.0330 lb/day	2.5 lb/day
1,2-Dichloroethane	12.22 lb/yr	260 lb/yr
1,3-Butadiene	6.97 lb/yr	11 lb/yr
1,4-Dioxane	0.57 lb/yr	12 lb/day
2-Butanone	0.6153 lb/day	78 lb/day
Benzene	145.6 lb/yr	8.1 lb/yr
Chlorobenzene	0.1159 lb/day	46 lb/day
Dichlorodifluoromethane	0.3036 lb/day	5,200 lb/day
Dichloromethane	405.7 lb/year	1,600 lb/yr
Ethyl acetate	0.0147 lb/hr	36 lb/hr
Hexane	0.5685 lb/day	23 lb/day
Hydrogen sulfide	2.3206 lb/day	1.7 lb/day
Mercury (total)	0 lb/hr	0.013 lb/hr
Mercury (elemental)	0 lb/day	0.013 lb/day
Methanethiol	0.0058 lb/hr	0.013 lb/hr
Tetrachloroethylene	261.46 lb/yr	13,000 lb/yr
Toluene	5.7838 lb/day	98 lb/day
Vinyl chloride	68.93 lb/yr	26 lb/yr

9. Compliance Status:

The facility was in compliance with their permit during the most recent inspection conducted on July 26, 2016 by Robert Barker. An NOV/NRE was issued for the exceedance of the State BACT NOx limit during testing of the landfill gas-fired generator on September 25, 2014. An enforcement package was sent to RCO; however, it was rescinded after re-testing of the generator demonstrated compliance with the State BACT NOx limit.

10. Facility Emissions Review:

The emissions summary in the table below is based on the facility-wide summary submitted on Form D1 of the permit application. The emissions and calculations have been reviewed and appear to be a fair representation of facility-wide emissions. The emissions for the combustion by-products have been selected as either a maximum of the flare (CD-1) or LFG-fired engine (ES-2) emissions.

Facility Emissions Summary

Pollutant	Potential Emissions (tpy)	Expected Actual Emissions (tpy)
TSP	1.07	1.07
PM-10	1.07	1.07
PM-2.5	1.07	1.07
SO_2	0.57	0.57
NO_x	21.40	21.40
VOC	10.70	10.70
CO	53.50	53.50

Based on the emissions summary alone, this facility would be classified as a Small; however, due to the facility triggering NSPS Subpart WWW mass and volume Title V threshold requirements, a Title V permit is now required.

11. Other Considerations:

- A P.E. seal was included with this application.
- A zoning consistency determination was included with this application. The Rockingham County Zoning and Planning Agency signed the request on 11-21-14.
- This facility is not subject to the 112(r) program as it does not store any of the listed chemicals in quantities above the program thresholds.

12. Public Notice Review:

A 30-day public notice and 45-day EPA review period is required for this permit renewal/First Time Title V.

The 30-day public notice period was from XX through XX.

The EPA 45-day review period was from XX through XX.

13. Conclusions, Comments, and Recommendations:

This air permit application for the Rockingham County Landfill, located at 281 Shuff Road in Madison, NC, has been reviewed by DAQ to determine compliance with all procedures and requirements. The Winston-Salem Regional Office has made comments on the draft permit. Continued compliance with this air permit is expected. Recommend issuance of revised air permit No. 10200T02.